

REMARKS

In the Office Action issued on October 3, 2008, the Examiner

- objected to claims 7, 63, and 69 for informalities;
- rejected claims 12, 16, 35, and 47 under the second paragraph of 35 U.S.C. §112 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention;
- rejected claims 1, 3, 26, 28, 29, 51 through 53, 56, and 58 through 60 under 35 U.S.C. §102(b) as being anticipated by Will *et al.* (DE 101 55 492) (hereinafter referred to as "Will");
- rejected claims 60 and 61 under 35 U.S.C. §102(b) as being anticipated by Kato *et al.* (JP 06-224510) (hereinafter referred to as "Kato");
- rejected claims 60 and 61 under 35 U.S.C. §102(b) as being anticipated by Kahlen *et al.* (United States Patent No. 5,276,699) (hereinafter referred to as "Kahlen"); and
- rejected claims 60 and 61 under 35 U.S.C. §102(b) as being anticipated by Keaton *et al.* (United States Patent No. 6,563,995) (hereinafter referred to as "Keaton"); and
- rejected claims 13 through 15, 30, 31, and 69 under 35 U.S.C. §103(a) as being unpatentably obvious over Will.

The Applicants have fully considered the Office Action and cited references and submit this Reply and Amendment in response to the Examiner's objections and rejections. Reconsideration of the application for patent is requested.

Objections to the Claims

The applicants have herein amended claim 7 to remove the term

"preferably." The applicants respectfully submit that this amendment completely addresses the stated objection to the claim, and request its withdrawal.

The applicants have herein amended claim 63 to add an ending period. The applicants respectfully submit that this amendment completely addresses the stated objection to the claim, and request its withdrawal.

The applicants have herein amended claim 69 to add a comma between the listed chromium and titanium items. The applicants respectfully submit that this amendment completely addresses the stated objection to the claim, and request its withdrawal.

Rejections under 35 U.S.C. §112, second paragraph

The applicants have herein amended claims 12 and 16 to change the dependency of each claim from cancelled claim 11 to independent claim 1. The applicants respectfully submit that this amendment overcomes the stated rejection of the claim and request its withdrawal.

The applicants have herein amended claims 35 to change its dependency to claim 26. The applicants respectfully submit that this amendment overcomes the stated rejection of the claim and request its withdrawal.

The applicants have herein amended claims 47 to remove the term "such as vacancies." The applicants respectfully submit that this amendment overcomes the stated rejection of the claim and request its withdrawal.

Rejections under 35 U.S.C. §102(b) based on Will

The Examiner rejected claims 1, 3, 26, 28, 29, 51 through 53, 56, and 58 through 60 under 35 U.S.C. §102(b) as being anticipated by Will.

Will fails to disclose an alteration of the refractive index that is a *lowering* of the refractive index of the region of the crystal being treated. While it is true that if Will is interpreted to disclose altering the refractive index, there must be either an increase or a decrease, Will fails to explicitly disclose a decrease in the

refractive index as is explicitly required by the claims as amended herein.

Apparently recognizing this lack of an explicit teaching, the Examiner asserts that:

"[i]t is inherent that the refractive index is altered because Will et al teaches a waveguide that is formed. A wave is guided when the surrounded by material of lower refractive index [sic]."

The Manual of Patent Examining Procedure states that "[t]he fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic." See M.P.E.P. §2112 citing to *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ.2d 1955, 1957 (Fed. Cir. 1993). The Court of Appeals for the Federal Circuit has clearly stated that probabilities and possibilities are insufficient:

"To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient."

In re Robertson, 169 F.3d 743, 745 49 USPQ.2d 1949, 1950-1951 (Fed. Cir. 1999) (citations omitted).

The Board of Patent Appeals and Interferences has described the Examiner's obligation in establishing inherency:

"[i]n relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art."

Ex parte Levy, 17 USPQ.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990).

The Examiner has failed to provide the required basis in fact or technical

reasoning to reasonably support a determination that a decreased or lowered refractive index necessarily flows from the teachings of Will.

In the subject Office action, the Examiner asserts that the teaching of both an increase and decrease in refractive index "jibes in the context of Will, because it teaches not only glass...but also ceramics and crystals." After acknowledging that a laser pulsing in glass *results in an increase in the refractive index*, the Examiner points to Borrelli, apparently in support of the asserted grounds of inherency:

"Further, it is noted that **glass** or silica-based material generally the composition of SiO₂, as evidenced by Borrelli paragraph [0055], which are **not crystal**." (emphasis in original)

The relevance of this statement to the anticipation rejection is unclear for several reasons. First, the meaning of the assertion regarding Borrelli is not grammatically clear. Second, the Examiner notes that the recited materials are not crystal, regardless of the fact that all rejected claims, other than independent claim 51 and the associated dependent claims, are specifically directed to crystals.

Furthermore, for at least two reasons, it cannot be fairly stated that a decreased or lowered refractive index necessarily flows from the teachings of Will.

First, it cannot be said, generally, that applying the described method to a crystal will reduce the refractive index. As clearly described in paragraph 51 of the present application, whether the refractive index is increased or decreased depends on the 'crystal material used' and, therefore, it is clear that a decrease in refractive index is not a necessary result of the use of crystal material, generally. Furthermore, as described in paragraph 52 of the present application, a positive change in the refractory index is achieved with the use of any of several suitable laser crystals. Therefore if the process of Will were to be used with such crystals, the change in refractive index would, indeed, be positive.

Second, Will makes it clear that the use of the described process in crystals would actually result in an increase in the refractive index. It is clear from figures 1 to 6 in the description of Will that the change to the refractive index including the crystal is positive. As the examiner states on page 6:

"...Will et al teaches a waveguide that is formed. A wave is guided when the surrounded by material lower refractive index [sic]."

As is clear in all of figures 1 to 6, Will creates a wave guide by "single tracking," which inscribes a single channel through a block of transparent material (glass or crystal). This channel is then said to be a wave guide. The channel can only be a waveguide if the refractive index in the surrounding areas is *lower* and therefore it can only be a waveguide if the refractive index of the channel is *higher* than the rest of the transparent material. Since the refractive index of the channel must be *higher*, it is clear that the refractive index of the material was actually *increased* by the laser writing process because the channel is created by that process. Thus, the "single tracking" process described does not, and cannot, "lower the average refractive index of the region of the crystal along the path," which is explicitly required by claim 1.

Instead the creation of a waveguide using the current invention can only be achieved by bordering or surrounding unaltered crystal material with multiple altered regions in order to create a region surrounded by lower refractive index. This process for the current invention is described in paragraph 54. There is no disclosure of such a process in Will nor would you expect there to be since in the process of Will it is clear that the refractive index is increased not decreased.

For at least these reasons, the required limitation "lowers the average refractive index of the region of the crystal" does not necessarily flow from the teachings of Will. As such, an anticipation rejection relying on a theory of inherency based on the disclosure of Will must fail. Furthermore, the Examiner has failed to provide the necessary support for a rejection based on inherency in relation to the amendments made herein. For at least these reasons, the

rejections of the claims are improper and should be removed.

Rejections under 35 U.S.C. §102(b) based on Kato

The Examiner rejected claims 60 and 61 under 35 U.S.C. §102(b) as being anticipated by Kato.

The Applicants have herein amended claim 60 to require that the tracks comprise "material modified by a laser in a way to mainly lower the refractive index." Kato does not disclose this limitation and cannot, therefore, properly serve as an anticipatory reference for the claim as amended herein.

Claim 61 depends from claim 60. The amendment to claim 60, therefore, overcomes the rejection of this claim for the same reason.

Withdrawal of this rejection of the claim is requested.

Rejection under 35 U.S.C. §102(b) based on Kahan

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Claim 61 depends from claim 60. The amendment to claim 60, therefore, overcomes the rejection of this claim for the same reason.

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index." Keaton does not disclose this limitation and cannot, therefore, properly serve as an anticipatory reference for the claim as amended herein.

Claim 61 depends from claim 60. The amendment to claim 60, therefore, overcomes the rejection of this claim for the same reason.

Withdrawal of this rejection of the claim is requested.

Rejections under §103(a) based on Will

The Examiner rejected claims 13 through 15, 30, 31, and 69 under 35 U.S.C. §103(a) as being unpatentably obvious over Will.

The applicants have herein amended claim 13 to require the limitation "such that the focus beam lowers the refractive index of the region of the crystal along the path..." Each of rejected claims 14 and 15 depend from independent claim 13.

For at least the reasons stated above, Will fails to disclose this required limitation, either explicitly or inherently. As a result, Will fails to disclose each and every limitation of the rejected claims and the Examiner has not asserted a *prima facie* case of obviousness.

Each of rejected claims require 30, 31 and 69 require "an inscribed optical structure wherein the structure has on average a lower refractive index to the rest of the crystal." For at least the reasons stated above, Will fails to disclose this required limitation, either explicitly or inherently. As a result, Will fails to disclose each and every limitation of the rejected claims and the Examiner has not asserted a *prima facie* case of obviousness.

Applicants respectfully submit that the rejected claims define nonobvious and patentable subject matter and request withdrawal of this rejection of the claims.

CONCLUSION

The Applicants have fully responded to the objections and rejections listed by the Examiner in the October 3, 2008 non-final Office Action. A Notice of Allowability relating to all claims currently under consideration is appropriate and respectfully requested by the Applicants.

Should the Examiner have any questions regarding this Reply and Amendment, or the remarks contained herein, the undersigned attorney would welcome the opportunity to discuss such matters with the Examiner.

Respectfully submitted,

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